Rio Grande Silvery Minnow Fact Sheet

Rio Grande Silvery Minnow (*Hybognathus amarus*)

Background

- Rio Grande Silvery Minnow (RGSM) is one of seven species of the genus *Hybognathus* found in the US
- Species first described by Girard in 1856 from specimens taken from the Rio Grande near Fort Brown, Cameron County, Texas
- Described as a stout silvery minnow with moderately small eyes and a small, slightly oblique mouth
- Adults may reach 3.5 inches in total length
- Dorsal fin is directly pointed with the front located slightly closer to the tip of the snout than to the base of the tail
- Life color is silver with emerald reflections
- Belly is silvery white, fins are plain, and barbells are absent

Life Stages of the RGSM

Life Stage	Size (mm)	Age	Predominant Habitat Use (>90%)	Depth (in)	Velocity (ft/s)	Substrate
Spawning	41 - 85	1+ year	Main Channel	7.9 – 31.5	1.3 – 3.0	Pelagic
Eggs	3	1 – 3 days	Main Channel	7.9 – 31.5	1.3 – 3.0	Pelagic
Pelagic Larvae	4	4 – 5 days	Main Channel	7.9 – 31.5	1.3 – 3.0	Pelagic
Young Juveniles	4 – 20	7 – 49 days	Main Channel, Shoreline-Pool	4.3 – 7.9	0.03 – 3	Silt – 100%
			Secondary Channel, Pool	0.4 – 3.9	0.4 – 0.7	
			Main Channel, Pool	8.3 – 11.8	--	
Older Juveniles	21 – 40	50 – 240 days	Backwater	0.4 – 7.9	0 – 0.7	Silt – 95% Sand – 4% Gravel – 1%
			Secondary Channel, Pool	4.3 – 23.6	0.03 – 1.6	
			Eddy	12.2 – 15.7	0	
			Main Channel, Shoreline-Pool	16.1 – 19.7	0.4 – 1.0	
			Secondary Channel, Run	0.4 – 23.6	0.7 – 1.3	
			Main Channel, Pool	8.3 – 11.8	1.0 – 2.3	
Adults	41 – 85	241 – 365 days	Eddy	12.2 – 31.5	0.03 – 0.3	Silt – 75% Sand – 20% Gravel – 3% Cobble – 2%
			Secondary Channel – Pool	4.3 – 19.7	0 – 0.3	
			Secondary Channel – Run	4.3 – 19.7	0.7 – 1.0	
			Secondary Channel, Shoreline-Pool	0.4 – 19.7	0.4 – 1.3	
			Backwater	0.4 – 23.6	0.4 – 1.3	

Historic Range

- At one time, one of the most abundant and widespread fishes in the Rio Grande Basin, occurring from Española, NM, to the Gulf of Mexico
- Found in Pecos River from Santa Rosa, NM, to its confluence with the Rio Grande in southern Texas
- Species presently occupies about five percent of its historical range
- Completely extirpated from the Pecos River and from the Rio Grande downstream of Elephant Butte Reservoir
- Presently found in a 170 mile reach of the Middle Rio Grande, NM, from Cochiti Reservoir, Sandoval County, to the headwaters of Elephant Butte Reservoir, Socorro County

Species Decline

- RGSM no longer present in Pecos River Basin due to the introduction of the plains minnow (*H. placitus*)
    - Plains minnow believed to have been introduced into the Pecos drainage during 1968 by the release of bait minnows collected from the Arkansas River Basin
    - Replacement of RGSM by plains minnow complete in less than one decade
    - Plains minnow believed to be more tolerant of changing habitat than RGSM
    - Also believed that the two species hybridized

- Decline in Rio Grande Basin believed to have begun in 1916 with the closing of gates at Elephant Butte Reservoir
    - RGSM eggs are buoyant and travel downstream for one to three days until larvae are formed
    - RGSM larvae require and additional one to two days before they become young juveniles capable of swimming
    - Travel time for water released from Cochiti Reservoir to Elephant Butte Reservoir is approximately five days
    - Eggs produced by spawning RGSM in the Middle Rio Grande Valley travel to Elephant Butte Reservoir before they become young juveniles capable of swimming upstream

Summary of Factors Presently Affecting Species

- Disease or Predation
  - Predation by non-native fish such as northern pike, walleye, white bass, and smallmouth bass introduced into reservoirs by fish and wildlife management agencies
    - Non-native, sport fish species do not remain in reservoirs and make their way into Rio Grande
  - Parasitic organisms such as the *Ichthyophthirius multifilis* and *Lernaea* are thought to be promoted among fish subject to stress and confined to small pools
    - No studies have been conducted on the impact of disease and parasites on the RGSM – significance of threats to population due to disease has not been characterized

- Inadequacy of Existing Regulatory Mechanisms
  - Game and Fish regulations in NM allow the use of live minnows, including those brought into the state from other drainages, for sport fishing
  - Practice has encouraged the spread of non-native species, one of which, the plains minnow, has completely replaced and hybridized with the RGSM in the Pecos River

- Man-made Factors
  - Channelization of the Rio Grande by placement of jetty jack structures along the river
    - Designed to protect levees by retarding flood flows, trapping sediment, and promoting the establishment of vegetation
    - Effects on RGSM not known
  - Alteration of flows, nutrients, and water quality by reservoirs and diversion dams
    - Reservoirs favor non-native fish species
  - Changes in water quality due to urbanization
    - Effects of water quality on RGSM not known

- Unknowns
  - Prior to the construction of reservoirs and the establishment of large communities, the middle Rio Grande historically experienced periods of no flow
  - During no-flow periods, it is believed that the RGSM survived in areas where irrigation return flows re-entered the Rio Grande, in the pools formed by water leaking through the gates of the diversion dams, in the irrigation ditches and drains, and in the reaches of the stream above the diversions from which their offspring could repopulate downstream reaches when conditions became favorable
  - It is not known why these same factors do not provide a sufficient habitat to support the RGSM under current conditions